APPENDIX F

AIRLOCKS AND PERSONNEL PROCESSING

F-1. Airlock Description.

Airlocks will be used in Class I facilities where an overpressure must be maintained during collective protection operations.

a. *Stand-Alone Two-Stage Airlock*. As shown in Figure F-1, the stand-alone two-stage airlock has outer first stage and inner second stage compartments. Clean airflow is provided by a dedicated filter blower unit connected to the inner compartment at the filtered air inlet. The stand-alone airlock is designed for a 94 L/s (200 cfm) filter blower unit and intended for retrofitting to existing facilities. The outer compartment is used to remove protective garments while it is being continuously purged by the flow of filtered air. After protective garments are removed, personnel enter the inner compartment which is then purged of vapors during the dwell cycle. After the dwell period, personnel enter the toxic-free area (TFA).

b. *Integral Single-Stage Airlock*. As shown in Figure F-2, the integral single-stage airlock is provided with filtered air from the TFA. The overpressure in the TFA will cascade through the airlock, thereby continuously purging contaminants from the airlock. The design airflow rate will be determined by equation C-1. The airlock is used to remove protective garments while it is being continuously purged by the flow of filtered air. After the protective garments are removed, the airlock will be purged of vapors during the dwell cycle. After the dwell period, personnel enter the TFA.

F-2. Airlock Features.

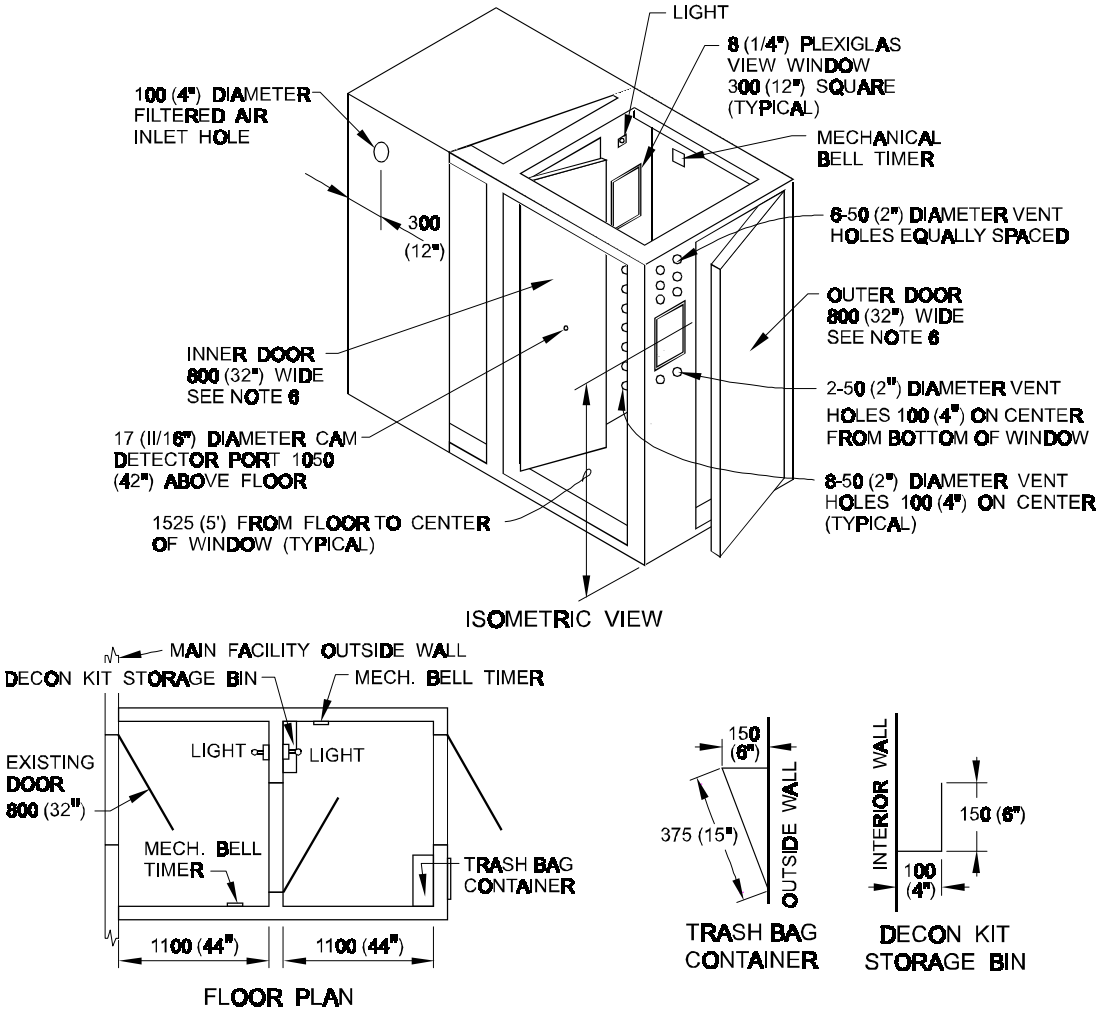
The following features are common to an integral or stand-alone airlock.

a. *Timers*. A mechanical bell timer to time the dwell and purge cycles is required in each compartment.

b. *Windows*. A window is required at each compartment to determine if it is occupied.

c. *Lights*. Lights are required because the interior lacks adequate natural lighting.

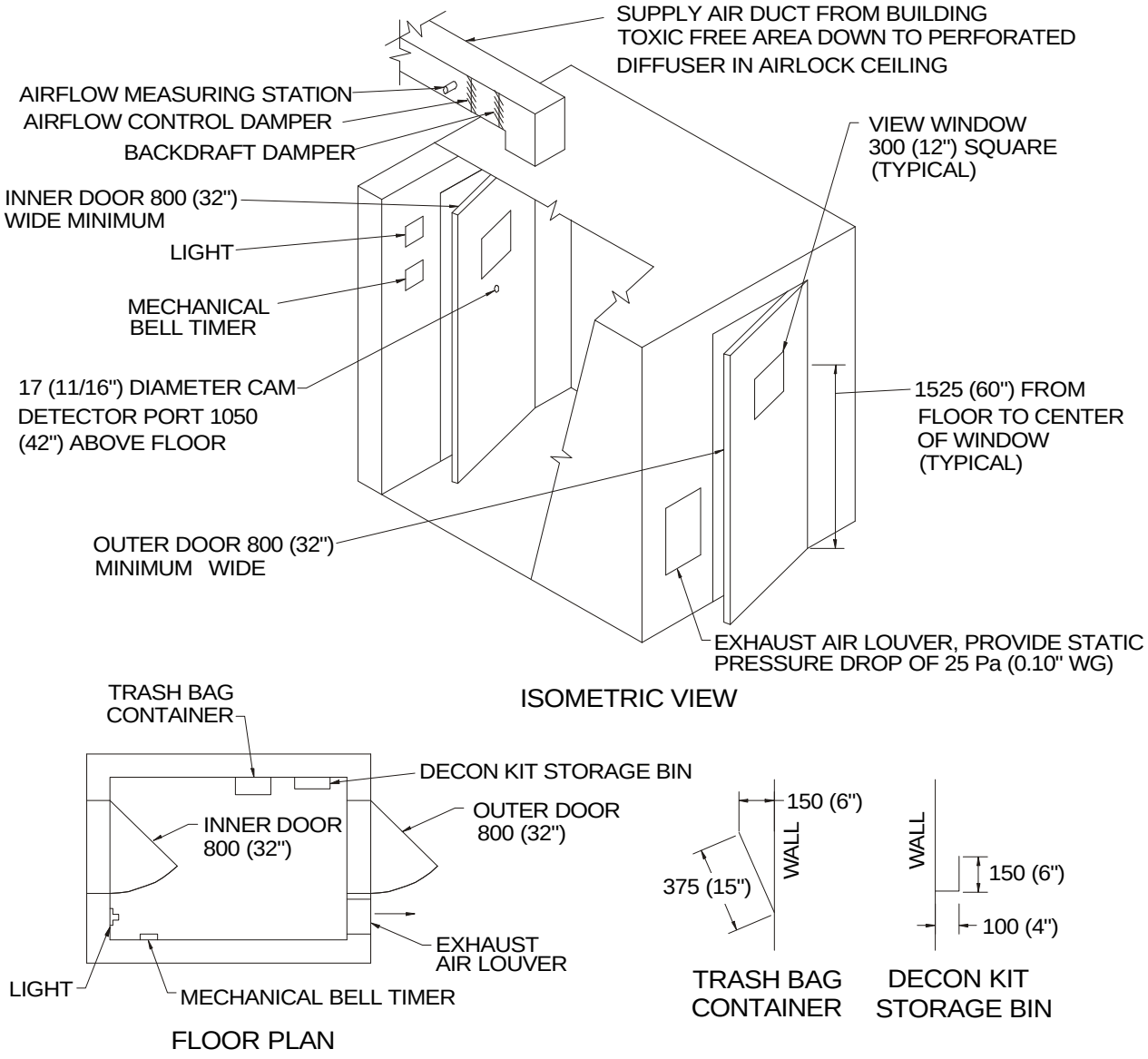
d. *Purge Vents*. The two-stage airlock has fixed rather than adjustable purge vents because it has a dedicated filter blower unit that makes the airflow rate easy to maintain. For an airlock without a dedicated filter blower unit, a variable area purge vent or flow control valve is required to adjust the airflow rate and maintain the required purge rate.



NOTES:

1. AIRLOCK INNER AND OUTER COMPARTMENTS ARE APPROXIMATELY 1350 (54") WIDE BY 1100 (44") LONG BY 2130 (7') HIGH MEASURING FROM INTERIOR SURFACES. INTERNAL VOLUME IS 3.27 m^3 (115.5 FT^3).
2. THE TRASH BAG CONTAINER AND DECON KIT STORAGE BIN ARE 375 (15") LONG.
3. VENT HOLES ON THE OUTER WALL START 125 (5") FROM THE CEILING. VENT HOLES ON THE INNER WALL START 125 (5") FROM THE FLOOR.
4. MECHANICAL BELL TIMERS ARE 1830 (6') ABOVE THE FLOOR.
5. THE FILTERED AIR INLET HOLE IS 300 (12") BELOW THE CEILING.
6. FOR MAIN FACILITY EXISTING DOORS THAT ARE 900 (36") WIDE, USE INNER AIRLOCK AND OUTER DOORS THAT ARE 900 (36") WIDE. THE AIRLOCK INNER AND OUTER COMPARTMENTS WILL BE APPROXIMATELY 1450 (58") WIDE BY 1100 (44") LONG BY 2130 (7') HIGH MEASURING FROM INTERIOR SURFACES. INTERNAL VOLUME IS 3.51 m^3 (124 FT^3).

Figure F-1. Two-Stage Airlock Diagram.



NOTES:

1. AIRLOCK COMPARTMENT IS APPROXIMATELY 1400 (56") WIDE BY 2000 (80") LONG BY 2200 (88") HIGH MEASURING FROM INTERIOR SURFACES.
2. INTERIOR VOLUME IS 6.16 M^3 (228 FT^3).
3. THE TRASH BAG CONTAINER AND DECON KIT STORAGE BIN ARE 375 (15") LONG.
4. BOTTOM OF EXHAUST AIR LOUVER IS 8" ABOVE THE FLOOR.
5. THE MECHANICAL BELL TIMER IS 1830 (72") ABOVE THE FLOOR.
6. THE SUPPLY AIR DIFFUSER IS CENTERED BETWEEN THE SIDE WALLS AND 300 (12") FROM THE INNER DOOR.

Figure F-2. Single-Stage Airlock Diagram.

e. *Monitoring Port*. The monitoring port allows the chemical agent monitor (CAM) detector inlet to be inserted into the outer compartment by a CAM operator located in the inner compartment. This allows the CAM operator to determine if there is agent vapor in the outer compartment. With a negative reading in both the G and H mode (about 10 seconds each), the operator may determine that a shorter or longer dwell period is required. A second CAM check for sorbed vapor can then be performed in the inner or second stage compartment.

f. *Caulking*. Caulking should be applied to all joints to limit uncontrolled air leakage.

g. *Paint*. Painting the interior and exterior surfaces with epoxy paint is required to minimize the sorption of liquid and vapor agent.

h. *Instructional Signs*. Basic personnel processing instructions should be provided on the outer and inner doors.

i. *Clothing Chute or Trash Bag Container*. A clothing chute allows contaminated clothing to be removed from the airlock and discarded outdoors without re-exposure of personnel to the contaminated atmosphere. As an alternative, plastic trash bags can be placed in the airlock so that personnel can seal clothing in the bag after removal. The bag is then removed by the next group entering the airlock. If a clothing chute is not provided, a trash bag container should be provided.

F-3. Recommended Airlock Signs.

Recommended signs to be stenciled on the airlock are shown in Tables F-1 and F-2.

Table F-1
Stand-Alone Two-Stage Airlock Signs

Sign Text	Location
1. Two-Stage Airlock	1. Above the outer door.
2. Do Not Open if Airlock is Occupied	2. On the outer door.
3. Upon Entering, Set Timer for 4 Minutes	3. On the outer door below the other sign.
4. Remove Mask Only After 4-Minute Purge and/or CAM Check	4. On the second door, read from the outer compartment.
5. Filtered Air Input	5. Near the filtered air inlet.
6. CAM Check Port	6. On the second door above the CAM port.
7. Remove Outer Garments Before Processing to Next Compartment if Exposed to Chemical Agent	7. On the second door, read from the outer compartment, below the other sign.
8. Set Timer for 4 Minutes	8. On the second door, read from the inner compartment.

Table F-2
Integral Single-Stage Airlock Signs

Sign Text	Location
1. Airlock	1. Above the outer door.
2. Do Not Open if Airlock is Occupied	2. On the outer door.
3. After Removal of IPE, Set Timer for 3 Minutes*	3. On the outer door below the other sign.
4. Remove Mask Only After 3-Minute Purge and/or CAM Check**	4. On the second door, read from inside the airlock compartment.
5. CAM Check Port	5. On the second door above the CAM port.

* Actual time required is determined by equation C-1.
** Actual purge time is determined by equation C-1.

F-4. Processing Procedure Recommendations.

Processing procedures are the responsibility of the local command authority. Basic and commonly used ingress in-processing procedures are shown in Tables F-3 an F-4. If detector paper indicates liquid contamination on outer garments, open-air decontamination may be required before entering the airlock.

Table F-3
Two-Stage Airlock Processing Procedures

Item	Description
1	Before entering the airlock first stage, ensure that the airlock filter blower unit is operating and that air is being discharged from the purge vents.
2	Look through the view window to ensure that the first stage is not occupied. If unoccupied, enter the airlock first stage.
3	After entering the airlock first stage, remove any items left from the previous in-processing group. Set the timer to 4 minutes. During the 4-minute dwell time, remove outer garments and put them in the trash bag or clothing chute provided.
4	When the 4-minute dwell time is complete, personnel in the second stage of the airlock should check the first stage with a chemical agent monitor to ensure that the contaminants have been sufficiently removed. After the first stage has been checked and no contaminants have been detected, proceed to the second stage.
5	After entering the second stage, set the timer for a 4-minute purge time. After the 4 minutes have elapsed, hold your breath, remove your mask, and enter the TFA. Depending on user requirements, the mask is either placed in a mask bag, sealed, and taken into the shelter for use during an emergency or the mask is left in the airlock and removed by the next processing group.

Table F-4
Single-Stage Airlock Processing Procedures

Item	Description
1	Before entering the airlock, ensure that air is being discharged from the purge vents.
2	Look through the view window to ensure that the first stage is not occupied. If unoccupied, enter the airlock.
3	After entering the airlock, remove any items left from the previous in-processing group. Remove outer garments and put them in the trash bag or clothing chute provided. Set the timer for a 3-minute dwell time (or as determined by equation C-1).
4	When the dwell time is complete, personnel in the toxic-free area should check the airlock with a chemical agent monitor to ensure that the contaminants have been sufficiently removed. After the airlock has been checked and no contaminants have been detected, proceed to the toxic-free area.
5	After entering the second stage, set the timer for a 4-minute purge time. After the 4 minutes have elapsed, hold your breath, remove your mask, and enter the TFA. Depending on user requirements, the mask is either placed in a mask bag, sealed, and taken into the shelter for use during an emergency or the mask is left in the airlock and removed by the next processing group.